

as follows: $H = 4.92 + 0.00190 W$ ($H' = 125 + 0.107 W'$) (see Figure W-24).

(k) *Source of standard.* The standard in this section is derived from, and restates, in part, Society of Automotive Engineers ("SAE") standard J334a-1970 ("Protective frame test procedures and performance requirements"). The SAE standard appears in the 1971 SAE Handbook, which may be examined at any OSHA regional office.

[70 FR 76985, Dec. 29, 2005, as amended at 71 FR 41129, July 20, 2006]

§ 1926.1003 Overhead protection for operators of agricultural and industrial tractors used in construction.

(a) *General*—(1) *Purpose.* When overhead protection is provided on wheel-type agricultural and industrial tractors, the overhead protection shall be designed and installed according to the requirements contained in this section. The provisions of 29 CFR 1926.1001 for rubber-tired dozers and rubber-tired loaders may be used instead of the standards contained in this section. The purpose of this standard is to minimize the possibility of operator injury resulting from overhead hazards such as flying and falling objects, and at the same time to minimize the possibility of operator injury from the cover itself in the event of accidental upset.

(2) *Applicability.* This standard applies to wheel-type agricultural and industrial tractors used in construction work (see 29 CFR 1926.1002(b) and (j)). In the case of machines to which 29 CFR 1926.604 (relating to site clearing) also applies, the overhead protection may be either the type of protection provided in 29 CFR 1926.604, or the type of protection provided by this section.

(b) *Overhead protection.* When overhead protection is installed on wheel-type agricultural or industrial tractors used in construction work, it shall meet the requirements of this paragraph. The overhead protection may be constructed of a solid material. When grid or mesh is used, the largest permissible opening shall be such that the maximum circle that can be inscribed between the elements of the grid or mesh is 1.5 in. (38 mm) in diameter. The overhead protection shall not be installed in such a way as to become a hazard in the case of upset.

(c) *Test procedures—general.* (1) The requirements of 29 CFR 1926.1002(d), (e), and (f) shall be met.

(2) Static and dynamic rear load application shall be distributed uniformly along a maximum projected dimension of 27 in. (686 mm), and a maximum area of 160 sq. in. (1,032 sq. cm), normal to the direction of load application. The load shall be applied to the upper extremity of the frame at the point that is midway between the centerline of the seat and the inside of the frame upright.

(3) The static and dynamic side load application shall be distributed uniformly along a maximum projected dimension of 27 in. (686 mm), and a maximum area of 160 sq. in. (1,032 sq. cm), normal to the direction of load application. The direction of load application is the same as in 29 CFR 1926.1002 (g) and (h). To simulate the characteristics of the structure during an upset, the center of load application may be located from a point 24 in. (610 mm) (K) forward to 12 in. (305 mm) (L) rearward of the front of the seat backrest, to best use the structural strength (see Figure W-25).

(d) *Drop test procedures.* (1) The same frame shall be subjected to the drop test following either the static or dynamic test.

(2) A solid steel sphere or material of equivalent spherical dimension weighing 100 lb (45.4 kg) shall be dropped once from a height 10 ft (3.08 m) above the overhead cover.

(3) The point of impact shall be on the overhead cover at a point within the zone of protection as shown in Figure W-26, which is furthest removed from major structural members.

(e) *Crush test procedure.* (1) The same frame shall be subjected to the crush test following the drop test and static or dynamic test.

(2) The test load shall be applied as shown in Figure W-27, with the seat positioned as specified in 29 CFR 1926.1002(d)(4). Loading cylinders shall be mounted pivotally at both ends. Loads applied by each cylinder shall be equal within two percent, and the sum of the loads of the two cylinders shall be two times the tractor weight as set forth in 29 CFR 1926.1002(e)(1). The

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maximum width of the beam illustrated in Figure W-27 shall be 6 in. (152 mm).

(f) *Performance requirements.* (1) *General.* The performance requirements set forth in 29 CFR 1926.1002(i)(2), (3), and (4) shall be met.

(2) *Drop test performance requirements.* (i) Instantaneous deformation due to impact of the sphere shall not enter the protected zone as illustrated in Figures W-25, W-26, and W-28.

(ii) In addition to the dimensions set forth in 29 CFR 1926.1002(i)(1)(i), the following dimensions apply to Figure W-28:

$H = 17.5$ in. (444 mm); and

$J = 2$ in. (50.8 mm), measured from the outer periphery of the steering wheel.

(3) *Crush test performance requirements.* The protected zone as described in Figure W-28 must not be violated.

(g) *Source of standard.* This standard is derived from, and restates, in part, the portions of Society of Automotive Engineers ("SAE") standard J167–1970 ("Protective frame with overhead protection—test procedures and performance requirements"), which pertain to overhead protection requirements. The SAE standard appears in the 1971 SAE Handbook, which may be examined at any OSHA regional office.

[70 FR 76985, Dec. 29, 2005]

APPENDIX A TO SUBPART W—FIGURES W-14 THROUGH W-28

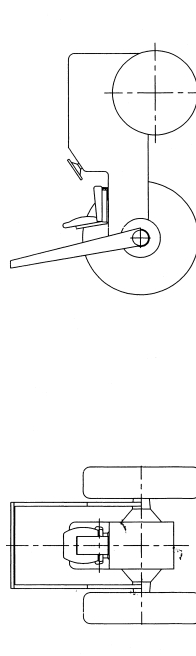


FIGURE W-14 - TYPICAL FRAME CONFIGURATION.

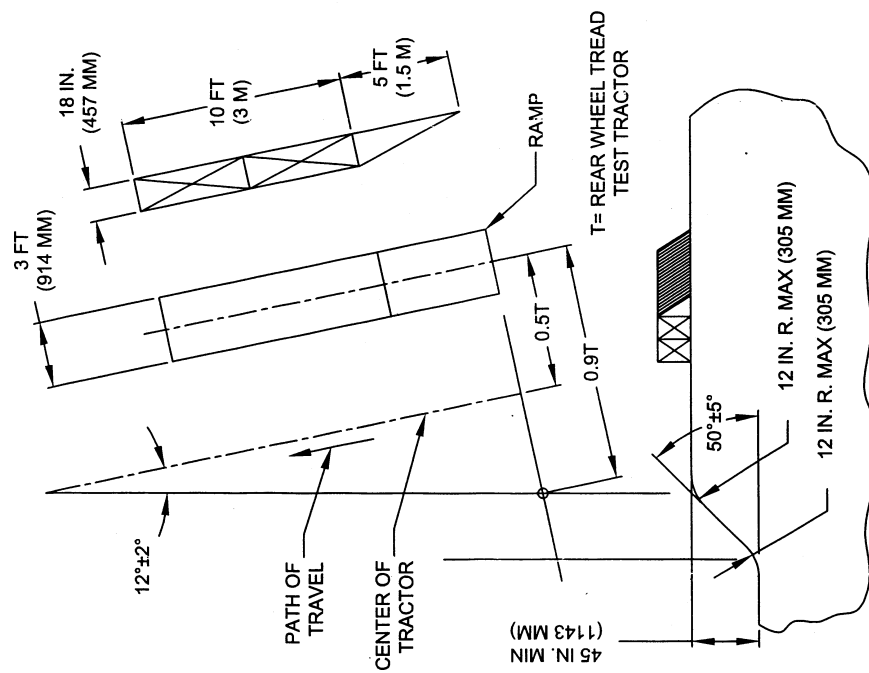


FIGURE W-15 - SIDE OVERTURN BANK AND RAMP.

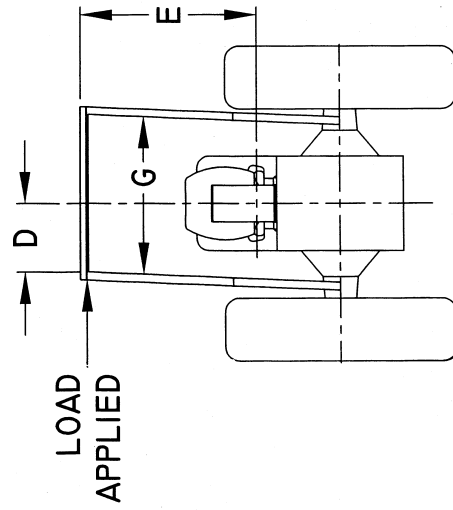


FIGURE W-16 - SIDE LOAD APPLICATION.

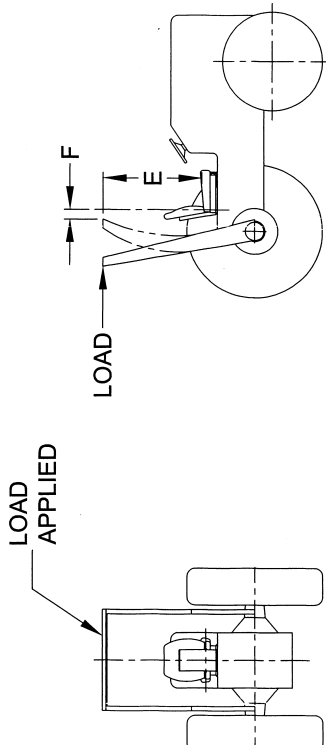


FIGURE W-17 - REAR LOAD APPLICATION.

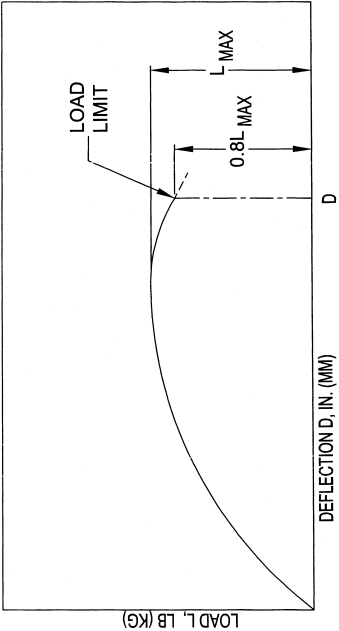


FIGURE W-19 - TYPICAL L-D DIAGRAM.

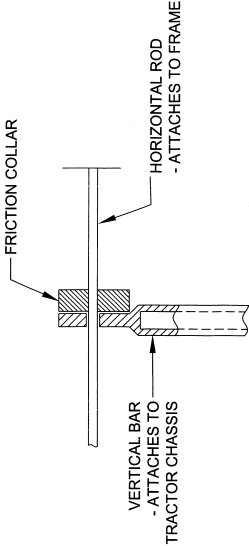
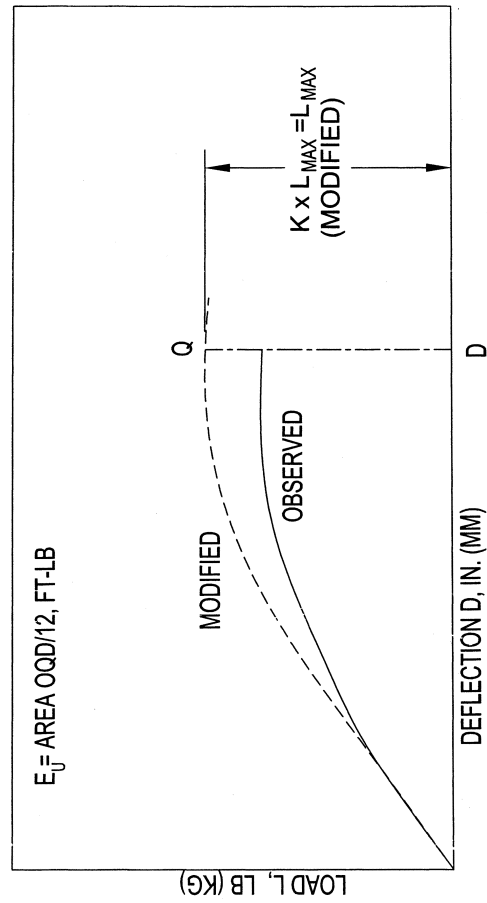


FIGURE W-18 - METHOD OF MEASURING INSTANTANEOUS DEFLECTION.

FIGURE W-20 - TYPICAL MODIFIED L_M - D_M DIAGRAM.

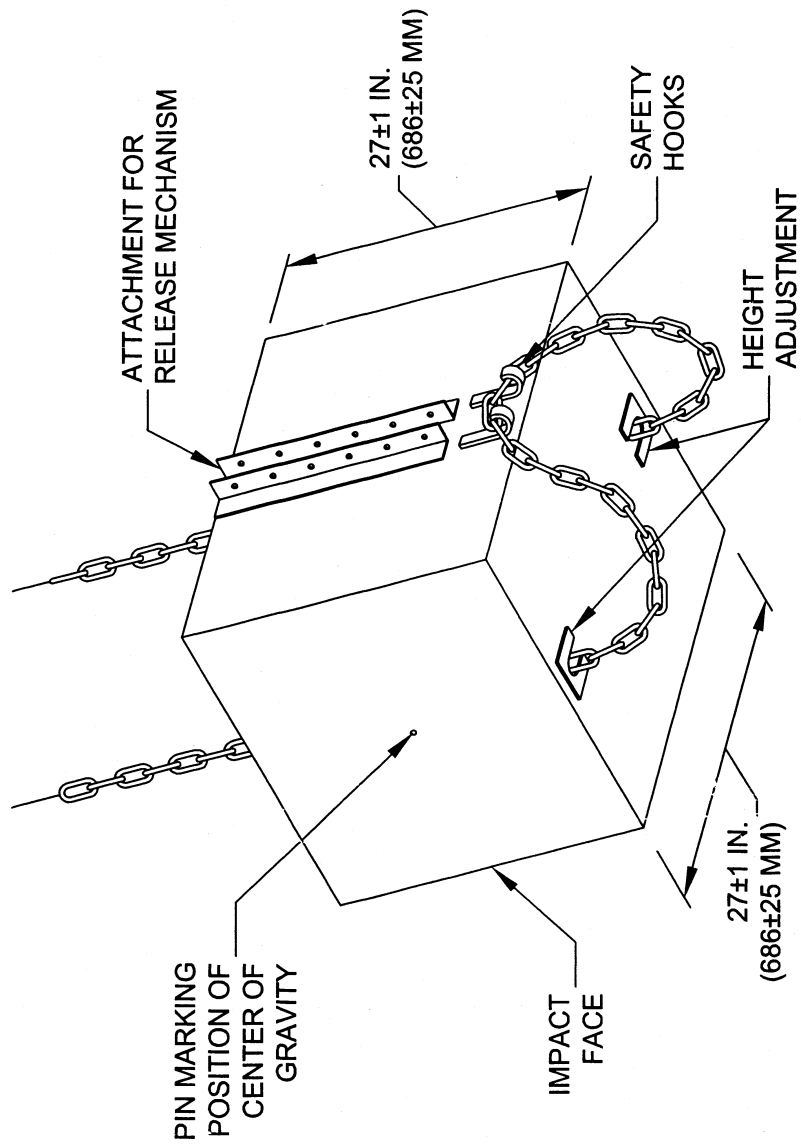


FIGURE W-21 - PENDULUM.

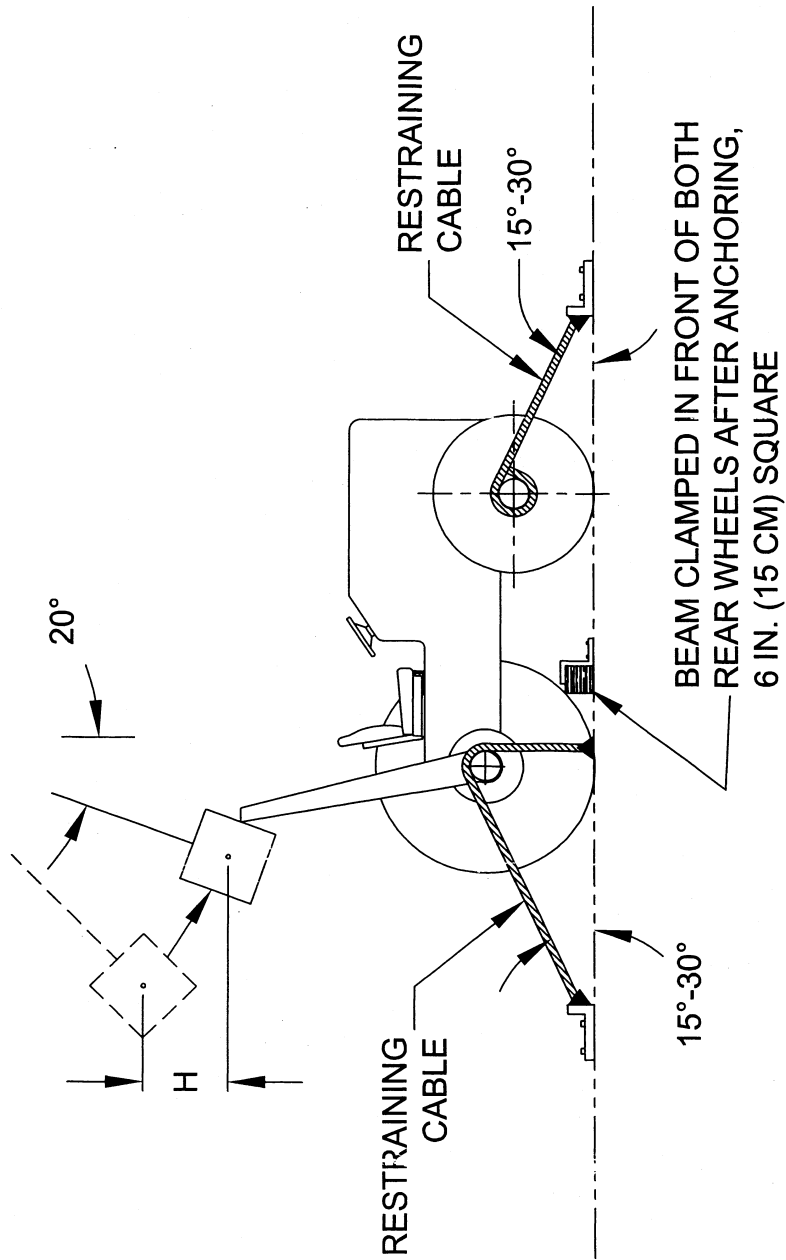


FIGURE W-22 - METHOD OF IMPACT FROM REAR.

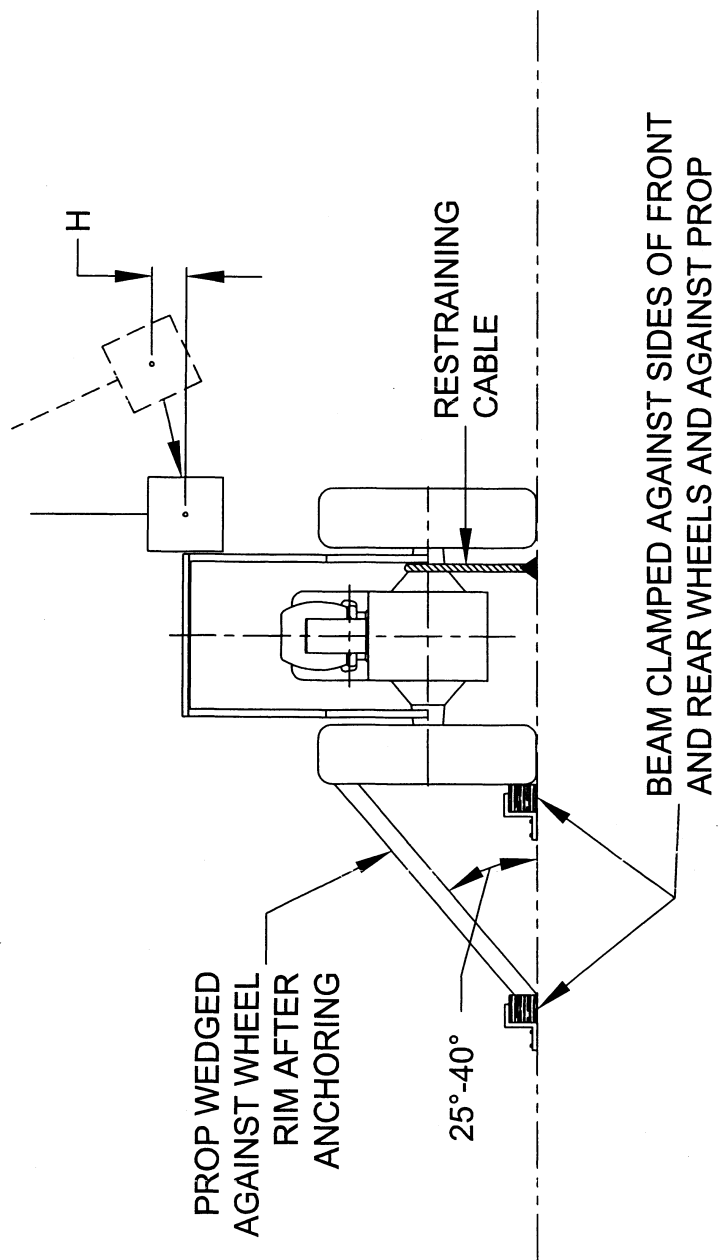
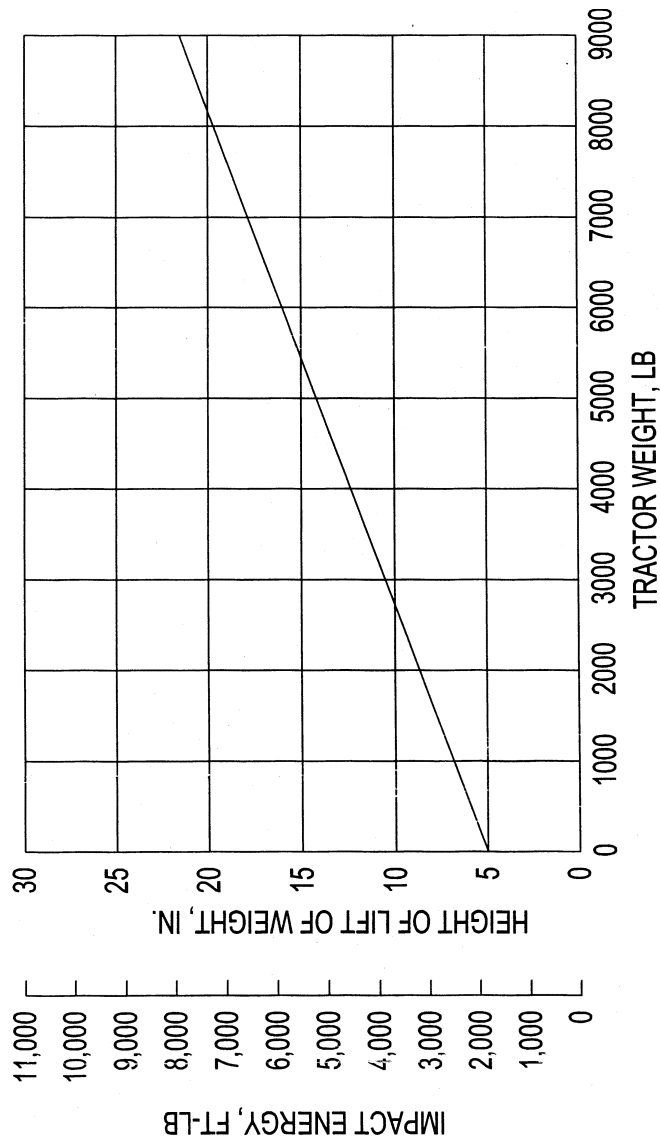


FIGURE W-23 - METHOD OF IMPACT FROM SIDE.



NOTATION OF FORMULAE

$$H = 4.92 + 0.00190W \text{ or } H' = 125 + 0.107W'$$

$$W = \text{tractor weight specified by 29 CFR}$$

$$1926.1002(e)(1) \text{ and } (e)(3) \text{ in lbs (W' in kg).}$$

**FIGURE W-24 - IMPACT ENERGY AND CORRESPONDING
LIFT HEIGHT OF 4,410 lb (2,000 kg) WEIGHT.**

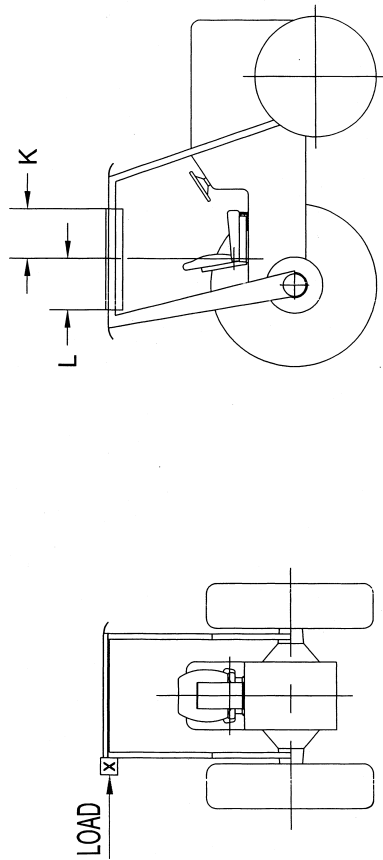


FIGURE W-25 - LOCATION OF SIDE LOAD.

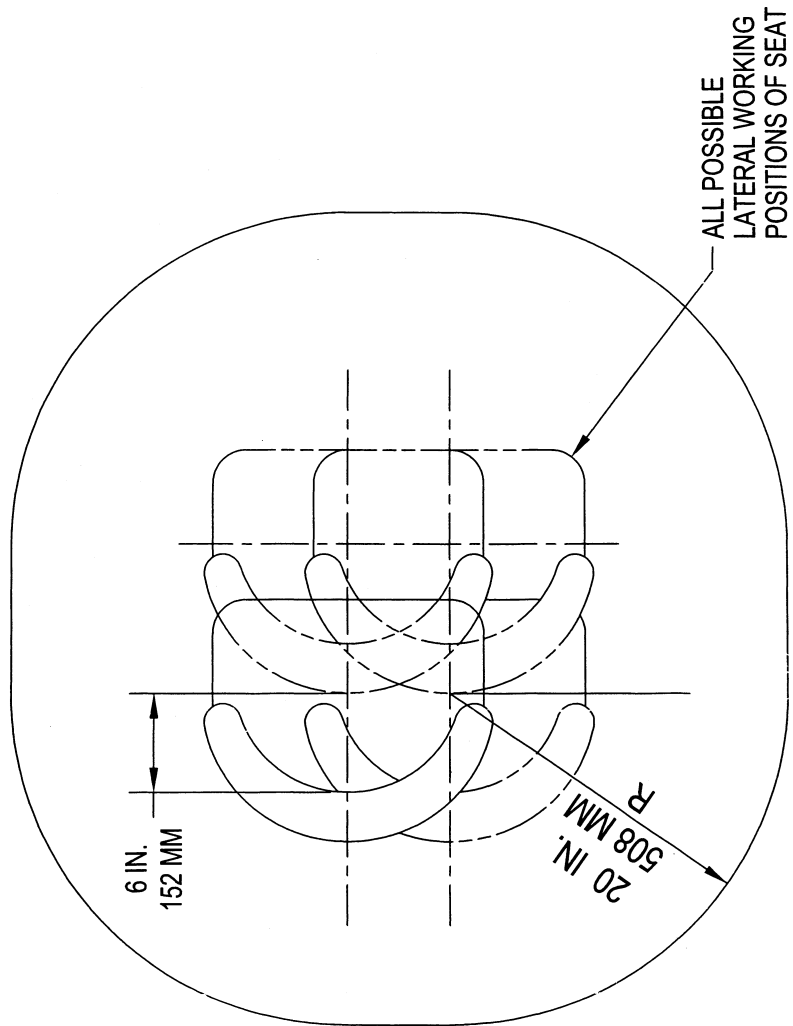


FIGURE W-26 - ZONE OF PROTECTION FOR DROP TEST.

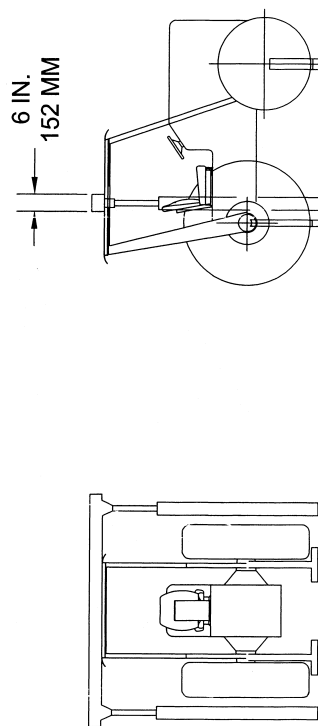


FIGURE W-27 - METHOD OF LOAD APPLICATION FOR CRUSH TEST.

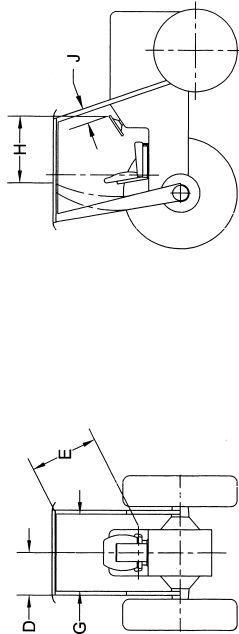


FIGURE W-28 - PROTECTED ZONE DURING CRUSH AND DROP TEST.

[70 FR 76985, Dec. 29, 2005, as amended at 71 FR 41130, July 20, 2006]

Subpart X—Stairways and Ladders

AUTHORITY: Section 107, Contract Work Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); Secs. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 1-90 (55 FR 9033); and 29 CFR part 1911.

SOURCE: 55 FR 47687, Nov. 14, 1990, unless otherwise noted.

§ 1926.1050 Scope, application, and definitions applicable to this subpart.

(a) *Scope and application.* This subpart applies to all stairways and ladders used in construction, alteration, repair (including painting and decorating), and demolition workplaces covered under 29 CFR part 1926, and also sets forth, in specified circumstances, when ladders and stairways are required to be provided. Addi-

tional requirements for ladders used on or with scaffolds are contained in subpart L—Scaffolds

(b) *Definitions.* *Cleat* means a ladder crosspiece of rectangular cross section placed on edge upon which a person may step while ascending or descending a ladder.

Double-cleat ladder means a ladder similar in construction to a single-cleat ladder, but with a center rail to allow simultaneous two-way traffic for employees ascending or descending.

Equivalent means alternative designs, materials, or methods that the employer can demonstrate will provide an equal or greater degree of safety for employees than the method or item specified in the standard.

Extension trestle ladder means a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable extension section, with a suitable means for locking the ladders together.